Table 2: Population of Antigua and Barbuda and Rates of Birth, Death, and Natural Increase, 1946–70

Year	Population*	Crude Birth Rate	Crude Death Rate	Natural Increase
	(number)	(per 1,000 population)		(percent)
1946	41,760	37.0	14.9	2.2
1950	46,250	36.2	11.8	2.4
1955	51,530	36.9	10.1	2.7
1960	54,210	34.6	9.9	2.5
1970	64,794	26.0	7.5	1.8

*1946, 1960, and 1970 are census counts; 1950 and 1955 are end-of-year estimates developed by Roberts and Harewood.

ports the conclusion that net migration in fact closely approximated zero.

Such an unexpected turn of events, particularly with reference to migration, begs an explanation. Natural-born Antiguans and Barbudans perhaps returned to the islands after having lived elsewhere, such as in Panama and Bermuda; there may have been some movement to Antigua and Barbuda from neighbouring islands; finally, the extent of emigration undoubtedly dropped over that quarter-century.

As for mortality, the era was marked by substantial declines in most developing regions, not only in the Caribbean. This resulted from new cures, such as penicillin for infectious diseases, which led to meaningful declines in deaths attributable to, for example, influenza and pneumonia.

For the period 1946–60, the seminal work by Caribbean demographers George Roberts and Jack Harewood* is invaluable; they developed not only population estimates by single year but rates of fertility, mortality, and migration as well (see Table 2).

Between 1946 and 1960, Antigua and Barbuda's population grew at an average annual rate of 1.9 percent. By 1960, it had reached 54,210. The period was marked by substantial declines in mortality and slight drops in fertility. The crude death rate was 14.9 in 1946 but only 9.9 in 1960. The drop in mortality was quite remarkable. By 1960, life expectancy approached 60 years at birth—not too different from many developed nations at that time.

The crude birth rate changed during these 14 years from 37.0 to 34.6. In 1946, women who had completed their reproductive years had had, on average, 4.6 live births. This rate, the total fertility rate (TFR), fell somewhat in this period, to perhaps 4.0 by 1960.

Net emigration is estimated to have been about 3,500 between 1946 and 1960, an average of 250 per year. However, most people who left from the nation did so between 1955 and 1960, when net emigration approached 3,000. Thus, net emigration was negligible between 1946 and 1955 but increased thereafter. These movements, it can be assumed, were principally toward the United Kingdom, although a few people undoubtedly migrated to other Caribbean countries.

The 1.9 percent average annual rate of growth noted between 1946 and 1960 was maintained over the following decade; according to the 1970 census, 64,794 persons lived in Antigua and Barbuda. The demographic patterns during this decade appear to have followed those noted in the previous ten years. Fertility kept falling,

*G.H. Roberts and Jack Harewood, *Estimates of Intercensal Population by Age and Sex and Revised Vital Rates for British Caribbean Countries, 1946–1960* (University of West Indies, 1964).

from 34.6 in 1960 to about 26.0 per 1,000 in 1970. Similarly, the crude death rate fell from 9.9 to around 7.5.

Thus natural increase remained quite high and overall population growth was only moderated by some net emigration. However, such movements were far less dramatic than those noted for other East Caribbean countries.

In sum, growth in Antigua and Barbuda was non-existent between 1844 and 1921. Indeed, the population in the latter year was lower than 80 years earlier. Between 1921 and 1970, however, the population more than doubled numerically—the result of fairly high levels of natural increase coupled with relatively low net emigration.

Antigua & Barbuda Today

No census has been taken in Antigua and Barbuda since 1970. As a result it is extremely difficult to arrive at any definitive statements about the nation's population in 1980. This report relies on both the 1970 census and the United Nations' 1980 estimate to arrive at a base population for 1980. This, in turn, allows projections to be developed of the islands' future population size and distribution.

According to the census of April 7, 1970, a total of 64,794 persons lived in Antigua (including about 1,000 on Barbuda). The U.N. estimated the population in mid-1980 was 75,200. Failing to find any evidence to the contrary, this is assumed to be the best estimate of the population as of that date. A projection of this estimate agrees with the government's figure as of July 1, 1983—77,226. These figures, over both 10 and 13 years, yield an annual average growth rate of 1.5 percent.

Between April 7, 1970, and July 1, 1980, there were about 14,000 births and 4,000 deaths in Antigua and Barbuda. This suggests that the 75,200 total developed by the U.N. reflects natural increase with virtually no net gain or loss through migration. Indeed, all informal discussions suggest that net emigration in the 1970s was relatively low in Antigua and Barbuda, although it was hardly zero. Nevertheless the U.N. estimate must be relied upon, as there is no other reliable source of information.

Fertility appears to have been quite low in Antigua and Barbuda during the last decade, although it is difficult to determine rates, given the lack of information on the total population. For example, in 1972 a total of 1,552 births were registered; therefore if indeed the total population that year was 68,000 (as the U.N. estimated), the crude birth rate then was 22.8 per 1,000. By 1977, using similar calculations, the rate was 20.4.

If the estimated total population has been exaggerated because of the failure to consider net emigration, then the crude rates were somewhat higher than indicated here. Nevertheless, it does seem quite clear that, irrespective of the size of the population, fertility was low and in fact fell from about 26.0 in 1970 to about 17.0 in 1980. The total fertility rate in 1980 has been estimated as 2.4 live births per woman, somewhat above the level needed to replace the population over the long run without migration.

Mortality, too, was reduced during the 1970s. Life expectancy in 1970 was around 62; by 1980 it appears to have been about 65 years at birth. The crude death rate also fell slightly—from 7.5 to 6.0 per 1,000 by 1980. Again, of course, these rates could vary somewhat depending on the true size of the overall population. Infant mortality also dropped in recent years—from about 40 per 1,000 live births in 1970 to 32 in 1980.

As noted above, net migration into and out of Antigua and Barbuda over the past decade may have been close to zero. A reported 5,373 residents of Antigua and Barbuda emigrated to the United States during the 1970s (see Table 3) and perhaps another 500 moved to Canada. On the other hand, the nation has become home to immigrants from neighbouring is-

Table 3: Permanent Antiguan- and Barbudan-Born Immigrants Admitted to the United States, 1960–79

Year	Number
1960–64	866
1965–69	1,535
1970–74	1,896
1975	435
1976	529
1977	835
1978	908
1979	770

lands and Guyana. It seems doubtful, however, that enough people entered the nation permanently to compensate for those leaving.

What is the exact annual net migration into or out of Antigua and Barbuda? That cannot be ascertained given the paucity of current information; for this report the U.N. estimated population of 75,200 for 1980 has been accepted, which suggests very little net migration over the decade.

Even without any net migration over the decade, the reduction in fertility as well as the improvements in life expectancy contributed to some changes in the age distribution of the population of Antigua and Barbuda (see Figure 1). In 1970, the median age was about 17 and the proportion of the population under 15 amounted to 44 percent. At the other end of the age spectrum, 5 percent of the population were elderly, that is, 65 or older.

By 1980, the median age was estimated to be 21; the proportion under the age of 15 was thought to be 32 percent and that of the elderly, 6 percent. Overall, then, the population aged slightly. This normally occurs when fertility falls, as it did in Antigua and Barbuda during the 1970s.

Such changes tend to lower the dependency ratio—that is, the number of persons of dependent ages (under 15 and over 64) per persons of active ages (15–64). In Antigua and Barbuda, this ratio appears to have changed from 96 dependents per active persons in 1970 to 62 in 1980—a remarkable decline in a relatively brief period.

Although changes in percent distribution in various age-groups are important, for policymakers the changing number of people in the respective age categories is perhaps even more relevant. For example, the number of school-age children (5–14) totaled 6,810 in 1980 according to the U.N.; in 1970, there were 18,900 children in that age-group. Again reflecting declining fertility in recent years, the school-age population has declined. On the other hand, the elderly population seems to have grown from 3,270 in 1970 to 4,417 in 1980—an increase of 35 percent in just ten years.

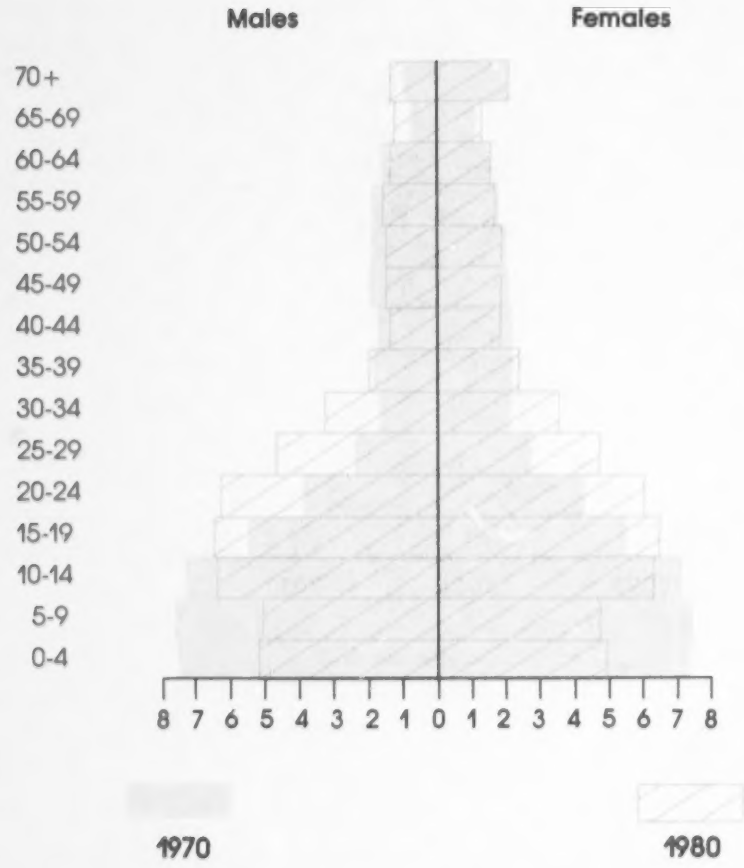
The demographic uncertainties due to the lack of a 1980 census in Antigua and Barbuda mean these statistics must all be interpreted with caution. They are approximations of reality and nothing more. Nevertheless, there seems to be some empirical evidence that fertility is falling and that life expectancy has been increasing in recent years. Net migration remains uncertain but all evidence suggests that it is not as great as that noted in some neighbouring countries, such as St. Kitts/Nevis and Dominica.

The overall rate of growth for the 1970s was still quite high, given the size of the nation and its carrying capacity. As Antigua and Barbuda faces the future, it is clear that population growth cannot continue indefinitely. How such growth can be curtailed is the main theme of the remainder of this report.

Antigua & Barbuda Tomorrow

It should be made clear that this report does not provide predictions of the future size of Antigua and Barbuda; rather, these are projections that stem from various assumptions about demographic behaviour—fertility, mortality, and migration.

Figure 1: Age-Sex Distribution of Antigua and Barbuda, 1970 and 1980

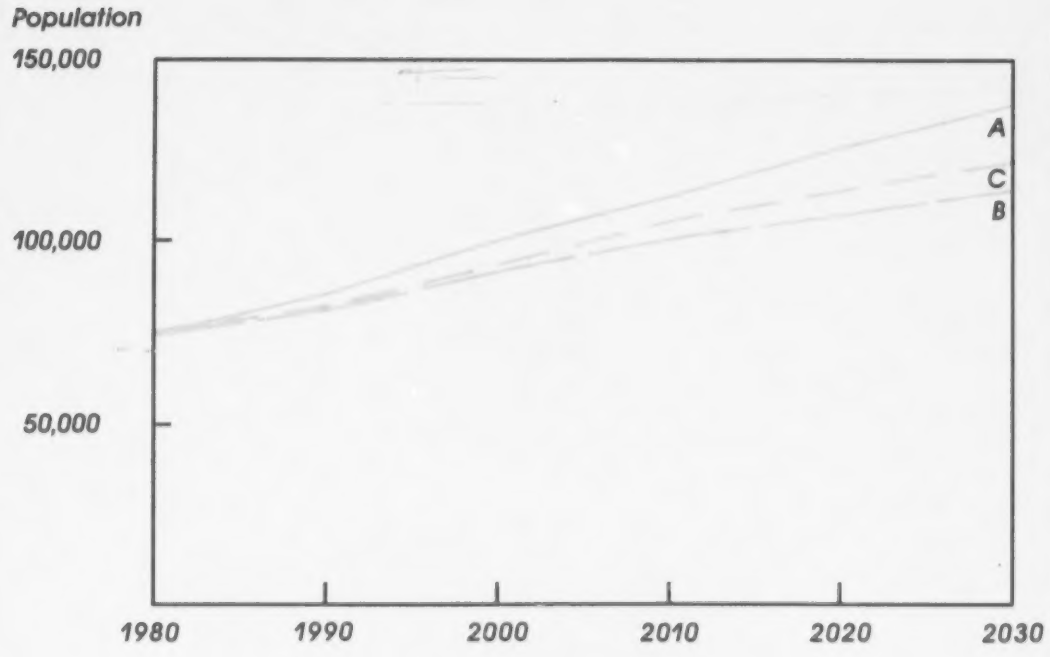


From these projections it is possible to anticipate what the population would be in the year 2000 or the year 2030, for example, if certain demographic patterns are followed. In that way policymakers will be better able to decide what steps to take, if any are deemed advisable.

Demographic Assumptions: Two patterns of fertility behaviour are projected. One extends the present level for the next 50 years. It assumes, that is, that women continue averaging 2.4 live births from now on. The other set assumes that fertility will fall to 2.1 live births per woman by 1990 and remain at that level thereafter. This is the level needed to eventually halt growth in the absence of migration. Only one set of mortality assumptions is used: that the current life expectancy of 66 years at birth for females and 63 for males will rise linearly to 75 and 71 years, respectively, by 2020 and remain at that level thereafter.

Two patterns of migration are postulated. One assumes no net migration—that is, that as many people will enter the country as leave it. The other model considers the possibility that some net emigration will occur in the future. Under this model, it is assumed that net emigration will amount to 250 per year from 1980 forward to 2030. The age distribution of these emigrants is assumed to be the same as noted for other Caribbean nations.

Figure 2: Population of Antigua and Barbuda, 1980–2030



A: TFR of 2.4, net migration of zero
B: TFR of 2.4, net emigration of 250
C: TFR of 2.1, net migration of zero

Based on these various sets of assumptions about fertility, mortality, and migration, three alternative scenarios have been created (see Figure 2; for supporting data, see Appendix Table A):

Scenario A–current fertility (2.4) and net migration of zero

Scenario B–current fertility (2.4) and net emigration (250 per year)

Scenario C–declining fertility (2.1) and net migration of zero.

Population Projections: Under Scenario A (a continuation of current fertility and no migration), the population would grow by about 26,000 between 1980 and 2000—an increase of 35 percent in 20 years. In turn, that total of 101,248 would continue to grow to nearly 138,200 by 2030. This represents an annual rate of growth over 50 years of about 0.6 percent. By 2030, the population would have increased some 63,000—just about the number of people in Antigua and Barbuda in 1970. In 2030, under this scenario, the crude birth rate would be 16.5 and the death rate 10.6, resulting in a natural growth of 0.58 percent per year.

Clearly, such growth cannot long continue. A country as small as Antigua and Barbuda must necessarily set limits on its eventual size. Its carrying capacity is obviously quite constrained. For the purposes of this report it is assumed that an eventual population of 110,000–120,000 is a reasonable goal, by which time zero population growth should be reached.

Short of increasing mortality, an alternative not to be even considered, population growth can be limited in only two ways: through reducing fertility and/or through increasing emigration. Scenarios

B and C illustrate these alternative patterns of demographic behaviour.

Under Scenario B, fertility is assumed to remain at its current approximate level of 2.4 live births per women for the next 50 years while annual net emigration is assumed to total 250 persons. That is to say, 250 more people would leave the nation each year than would enter it. This may well approximate what could indeed transpire in future years. Growth would be substantially lower than under Scenario A. For example, at the turn of the century the population of Antigua and Barbuda would stand at about 94,000 under B, some 7,000 (7 percent) less than under Scenario A. By 2030 the population would top 112,500, at which time growth would cease, to be followed by an approximately stationary period. (Extending these assumptions 20 more years shows that in 2050 the population would be close to 111,900.) Such a pattern of demographic behaviour would meet this report's stated goal—the attainment of zero population growth at about 110,000–120,000.

If such a scenario is deemed appropriate, close monitoring of both fertility and net migration will be required. Maintaining fertility at 2.4 live births per woman is quite reasonable, given the continued and increased acceptance of family planning on the part of young Antiguan and Barbudan couples. The assumption of a low level of net emigration also appears to be quite reasonable. Indeed, it may in fact reflect the current situation, although this is not certain.

Scenario C illustrates another path to follow if zero growth is to be attained in the relatively near future. This assumes no net emigration but that the fertility level will be reduced to 2.1 live births per woman. The TFR of 2.1 has been deliberately selected because that is the level that must be reached if population stabilization is to be attained eventually, assuming no migration. In other words, each couple has, on the average, 2.1 live births. (This, rather than 2.0, is the number needed for eventual replacement because not all women live to have children and because there are always more male than female births.) Despite replacement-level fertility beginning in 1990 and no migration—in or out—to consider, the population of Antigua and Barbuda would nevertheless continue growing for some time before leveling off.

Future population sizes would be slightly larger under Scenario C than under Scenario B. By the year 2000, the nation's population would be 96,450, and by 2030 it would approach 120,000, after which no further growth would be recorded. Thus even with low fertility, Antigua and Barbuda's population would still increase by about 45,000 (59 percent) before it stopped growing in about 50 years. This somewhat perplexing situation is due to the youthful age distribution of the current population. Because there are a fairly large number of young people today, the number of births would increase until 1995 before falling once again. This is what demographers refer to as "built-in momentum."

Following the demographic behaviour suggested in Scenario C would meet the goals stated above—that is, zero growth around a population of 110,000–120,000. Furthermore it would not require any net emigration. It would, however, necessitate a reduction in fertility to 2.1. Given the fact that the fertility rate in nearby Barbados has already fallen below 2.0, such a development in Antigua and Barbuda is certainly within the realm of possibility.

As both the scenarios above meet the stated goal of ultimate population size, which is more beneficial to the nation—Scenario B or Scenario C? Of course, it is important to bear in mind that these are only models and that reality can never be as exact. More likely, some combination of B and C would be followed and result in the same ultimate zero-growth population. What is particularly important is that the goal of a population of 110,000–120,000 within the relatively near future is not an unreasonable one for Antigua and Barbuda to follow. Constant monitoring of fertility and migration is, of course, necessary.

To better consider the relative merits of

Table 4: Percent Distribution of Population by Age-Group in Antigua and Barbuda, 1980–2030

Scenario	1980	1990	2000	2010	2020	2030
Scenario A						
Under 15	32	30	28	25	24	24
15–64	62	64	66	69	67	63
65 or older	6	6	6	6	9	13
Scenario B						
Under 15	32	30	28	24	23	22
15–64	62	64	66	69	67	62
65 or older	6	6	6	7	10	16
Scenario C						
Under 15	32	28	26	23	21	20
15–64	62	66	68	71	69	65
65 or older	6	6	6	6	10	15

the various scenarios, the impact of alternative demographic behaviour on the age distribution of the nation must be examined (see Table 4). Changes in fertility, mortality, or migration that took place in the 1950s and 1960s will affect the age distribution for many decades to come.

Irrespective of scenario, the proportion of elderly in Antigua and Barbuda will increase in future years. Indeed, that proportion will go from an apparent 6 percent in 1980 to between 13 and 16 percent in 2030. To a considerable extent this change will be at the expense of the younger people in the population, who will fall as a proportion of the entire population from 32 percent in 1980 to between 20 and 24 percent in 2030. Interestingly, the so-called active population (that is, those between 15 and 64) will not change much, proportionately speaking. From being 62 percent of the population in 1980, that group will increase to around 70 percent in 2010 before falling once again to approximately its current proportion in 2030.

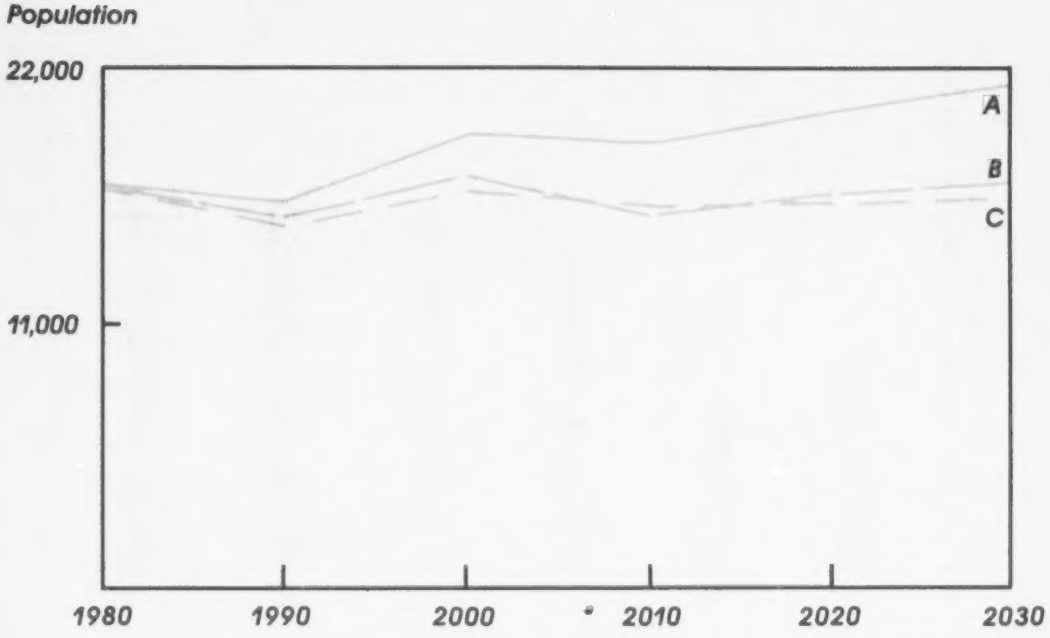
In sum, Antigua and Barbuda is aging. As noted earlier, this seems to have been the case during the recent decade and it seems bound to continue in the future. Such a situation is typical of nations exhibiting low levels of fertility and relatively low levels of migration, whether into or out of the nation.

The small projected change in the population in their active years means the dependency ratio is not expected to fluctuate widely over the next 50 years, though there will be temporary significant variations. Now 62 per 100, the ratio should be around 50 per 100 at the turn of the century and be once again approaching 60 by 2030. Because of relatively low fertility levels over the past ten years and because fertility is projected to remain low, dependency ratios in Antigua and Barbuda are far more favourable than in some other Caribbean nations.

While changing proportions of the population are of interest, as indicated earlier the changing *number* of people in various age-groups may be even more important, particularly for policymakers. Substantial variations in the number of individuals enrolled in school, looking for jobs, and 65 or older will result from changes—past, present, and future—in fertility, mortality, and migration.

School Enrollment: Despite being an ever-smaller proportion of the total population, the number of children between the

Figure 3: School-Age Population (5–14) in Antigua and Barbuda, 1980–2030



A: TFR of 2.4, net migration of zero
B: TFR of 2.4, net emigration of 250
C: TFR of 2.1, net migration of zero

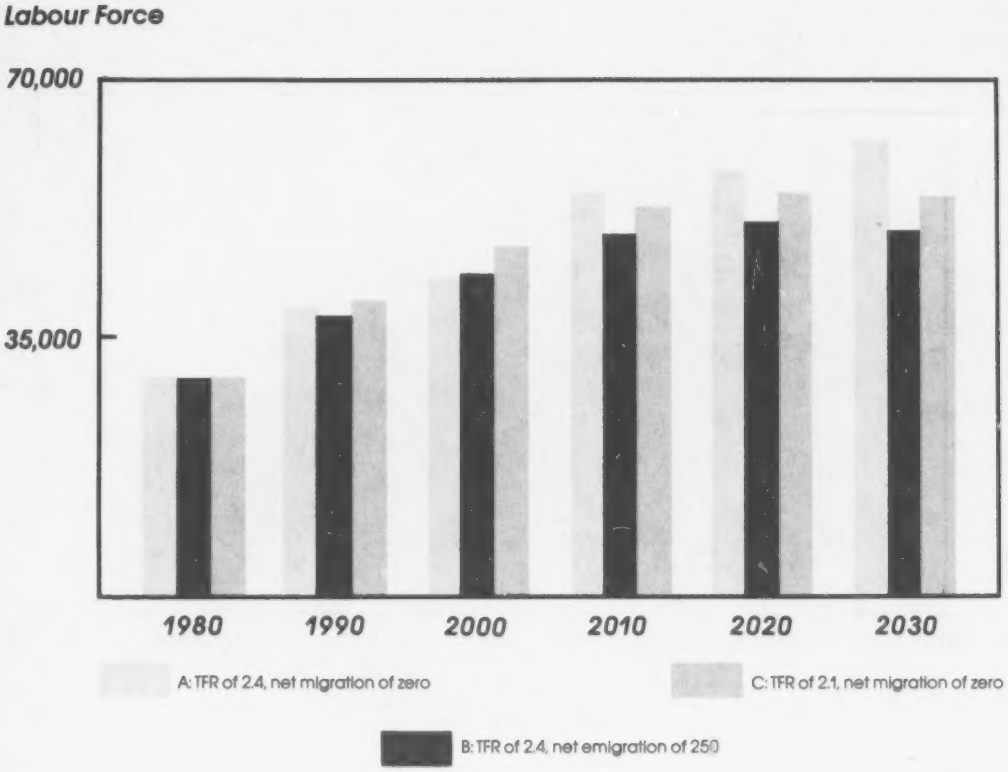
ages of 5 and 14 (the school-age group) would increase if fertility remains at 2.4 and net migration is zero (Scenario A). In 1980 there were estimated to be 16,809 persons in that age-group in the islands (see Figure 3; for supporting data, see Appendix Table B). That number would grow to 19,265 in 2000 and to nearly 21,500 by 2030 under these assumptions about demographic behaviour.

If, however, either Scenario B or Scenario C more closely approximates the demographic future, then school enrollments would hardly change at all. In both instances the number of children between 5 and 14 would peak at around 17,000 at the turn of the century and then fall ever so slightly to just above 16,000 in 2030—about the same number as in 1980. School enrollments should not, therefore, cause any major problems for the nation at least for the foreseeable future. This will be particularly true if fertility falls a little or if net emigration increases slightly.

Labour Force: For an estimate of the number of persons in the labour force between the ages of 15 and 64, the projected labour force participation rates for the East Caribbean developed by the International Labour Organization were used. The built-in momentum for growth referred to earlier in this report is especially noticeable here. Because of earlier high fertility, the number of persons between 15 and 64 will grow significantly in future years, regardless of scenario (see Figure 4; for supporting data, see Appendix Table C).

Between 1980 and 1990, some 10,000 jobs will have to be created just to maintain the current level of employment. If an unemployment rate of 15 percent is assumed, the number out of work but looking

Figure 4: Labour Force in Antigua and Barbuda, 1980–2030



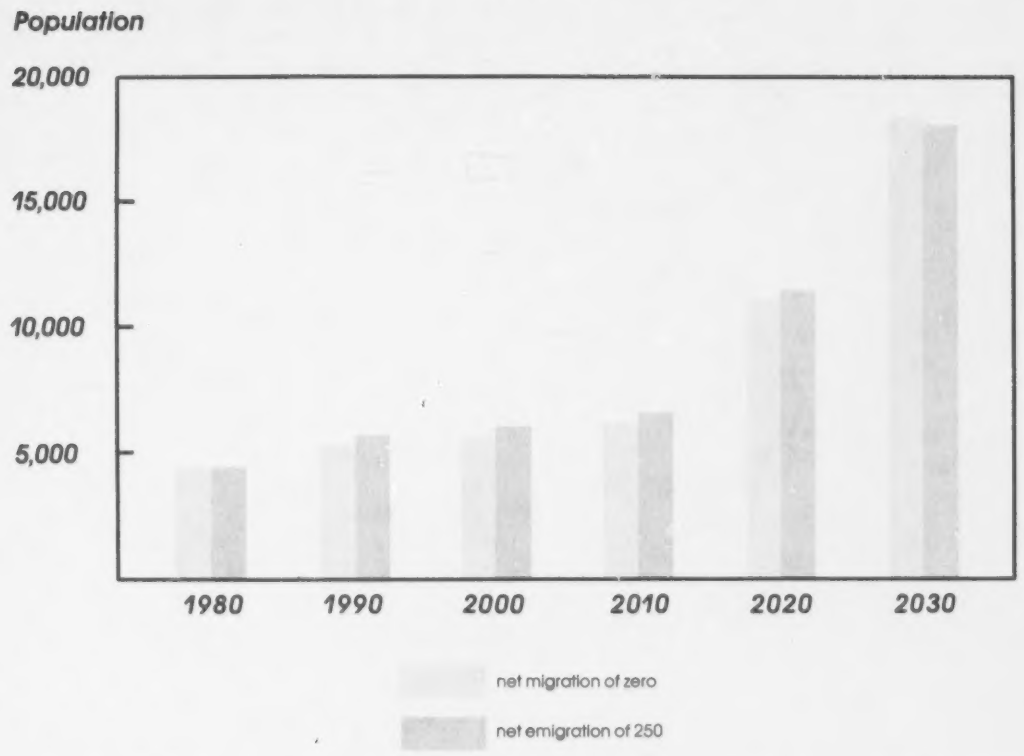
for a job will grow from 4,400 in 1980 to 5,800 in 1990. Here is a problem that was at least in part demographic in causation but that demands a nondemographic solution. In other words, the large number of entries into the labour force over the next few years reflects the relatively high fertility of 1965–75. As that cohort passes through this crucial stage of life it will prove troublesome for the economic health of the nation.

After the turn of the century, increasingly larger differences in the number of persons in the labour force would develop under the various scenarios. By 2030 the labour force would number nearly 62,000 if fertility is maintained at its present level and there is no net emigration (Scenario A), compared with 29,335 in 1980. With reduced fertility and no net emigration (Scenario C), the number would top 55,000. With continued fertility of 2.4 live births per woman and net emigration of 250 per year (Scenario B), the labour force would have grown to over 49,600 within 50 years.

From this brief examination of the impact of the various alternative forms of demographic behaviour on the need to create jobs in Antigua and Barbuda it seems that Scenario B is most suitable for the future socioeconomic health of the nation. A small number of emigrants contributes more to lowering the number of persons in the labour force than a reduced level of fertility does. Nevertheless, it is important to remember that regardless of scenario the number of individuals either working or looking for a job will grow substantially in the near future. Such a projection is sure to be correct—these people have already been born.

The Elderly: In 1980 the estimated elderly population of Antigua and Barbuda

Figure 5: Elderly Population (65 or Older) in Antigua and Barbuda, 1980–2030



was 4,418, representing 5.6 percent of the total population. Under all scenarios a massive increase in the number of elderly can be expected over the next half-century (see Figure 5; for supporting data, see Appendix Table D). (The projections of the elderly population are the same for Scenarios A and C, as in both cases there is no migration and fertility levels are irrelevant, for even in 2030 the population 65 or older would have been born prior to 1980.)

Growth will be slow at first, reaching between 5,500 and 6,100 in the year 2000. It is only after 2015 that numbers increase dramatically, to over 11,000 in 2020 and over 18,000 in 2030. Such a sudden increase reflects the high fertility in the islands before 1960. People born then will become 65 after 2020 and their numbers will pose a major problem for the society.

A similar situation exists in many other East Caribbean nations. The large cohorts born before family planning was widespread and accepted will cause problems as they go through life, culminating in the gerontological growth noted above. Thus policymakers should begin planning for a substantial increase in the number as well as the proportion of elderly in Antigua and Barbuda in about 30 years.

Conclusion: Because of the paucity of data for Antigua and Barbuda, due in large part to the failure to hold a national census in 1980, the United Nations estimates must be relied on for the base population estimate in 1980. Furthermore, total fertility rates as well as levels of migration are necessarily tentative in nature for the same reason. Nevertheless there is substantial evidence suggesting that fertility is quite low; life expectancy is fairly high and net emigration is assuredly low. Antigua and Barbuda must soon arrive at a situa-

tion of no further growth in population. A total of 120,000 people seems about as reasonable as possible, given the geographical limitations.

Such a goal can be met if fertility is lowered or if net emigration is maintained, even at a relatively low level. Irrespective of population size, however, Antigua and Barbuda soon has to face two problems directly related to past demographic behaviour—future needs for jobs and the problems associated with increasing numbers of elderly citizens.

Appendices

Table A: Current and Projected Population of Antigua and Barbuda, 1980–2030

Scenario	1980	1990	2000	2010	2020	2030
A	75,200	88,305	101,248	114,166	127,485	138,155
B	75,200	85,315	94,084	101,767	108,912	112,598
C	75,200	85,964	96,450	105,923	114,566	119,678

A: TFR of 2.4, net migration of zero
B: TFR of 2.4, net emigration of 250
C: TFR of 2.1, net migration of zero

Table B: Current and Projected School-Age Population (5–14) in Antigua and Barbuda, 1980–2030

Scenario	1980	1990	2000	2010	2020	2030
A	16,809	16,457	19,265	18,841	20,191	21,447
B	16,809	15,524	17,469	16,000	16,314	16,467
C	16,809	15,335	16,856	16,018	16,038	16,262

Table C: Current and Projected Labour Force in Antigua and Barbuda, 1980–2030

Scenario	1980	1990	2000	2010	2020	2030
A	29,335	39,015	42,742	54,981	57,538	61,950
B	29,335	38,057	43,374	48,871	50,401	49,634
C	29,335	39,334	47,335	52,658	55,294	55,058

Table D: Current and Projected Elderly Population (65 or Older) in Antigua and Barbuda, 1980–2030

Scenario	1980	1990	2000	2010	2020	2030
A and C	4,418	5,267	5,554	6,165	11,165	18,325
B	4,418	5,653	6,091	6,663	11,454	18,108

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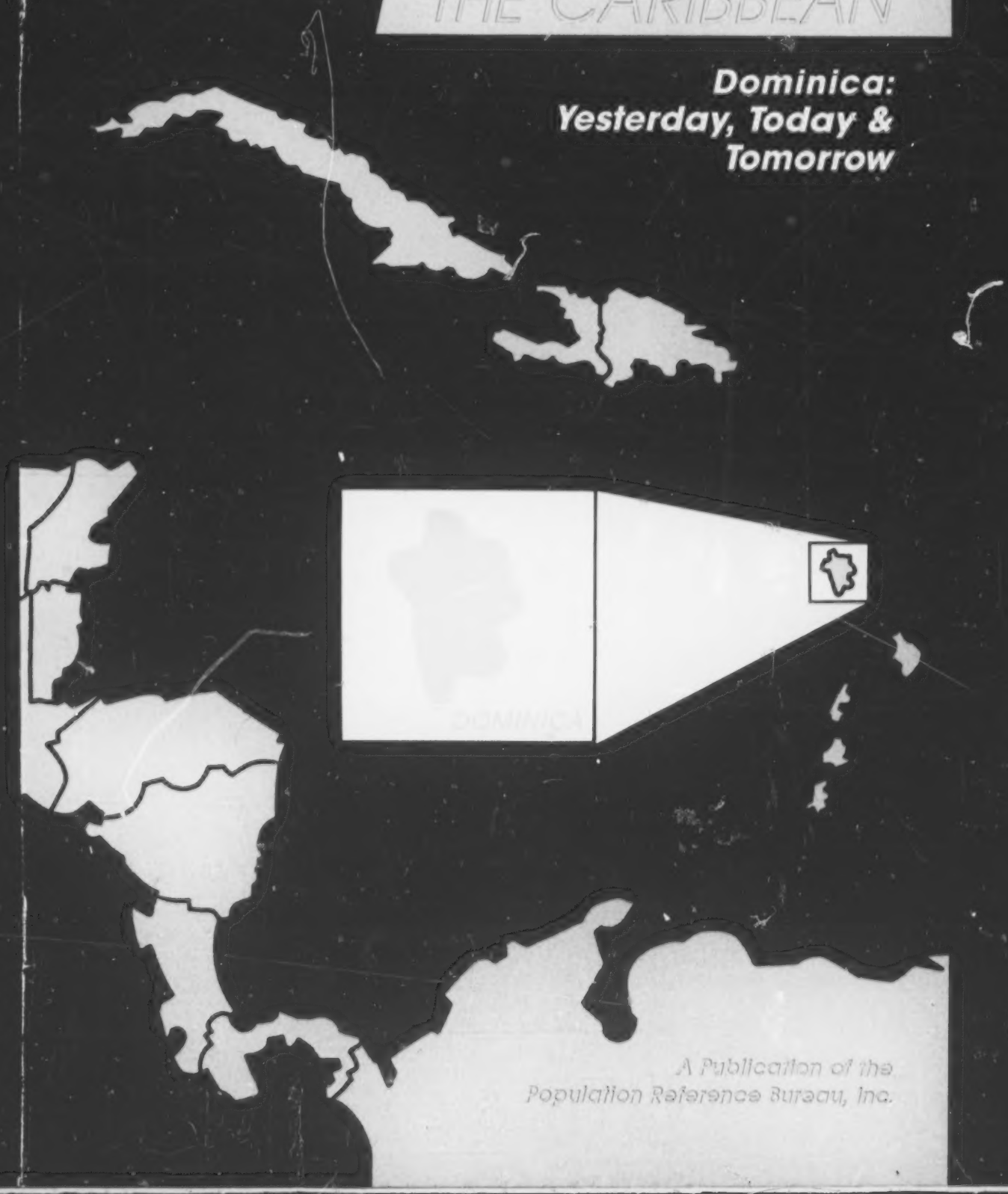

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This series of reports has been prepared by Dr. Leon F. Bouvier, Senior Demographer and Research Associate at the Population Reference Bureau, in Washington, D.C., under a contract with the United States Agency for International Development (Grant No. 538-0000-S-00-3028). The author thanks AID for its support, and CARICOM for its role in the wide dissemination of the reports throughout the Eastern Caribbean region.

The data used in the preparation of the population estimates and projections were selected by the author. Their use in no way suggests their acceptance as official demographic statistics by the Governments of the Eastern Caribbean.

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Dominica: Yesterday, Today & Tomorrow

by Leon F. Bouvier
March 1984

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Dominica
Yesterday, Today & Tomorrow

Dominica Yesterday

Somewhat over 22,000 people were enumerated when the first census following emancipation was taken in Dominica. The year was 1844. The next count was taken in 1871 and then every 10 years until 1921 (see Table 1).

Between 1844 and 1871, the population of Dominica increased to 27,178—a gain of 4,978, which was less than 0.8 percent per year. It can be assumed that natural increase was minimal. Both crude birth rates and crude death rates were undoubtedly extremely high resulting in little population growth. It is difficult to estimate levels of migration in the mid-nineteenth century, except to conclude that they probably were not substantial.

The six decennial censuses taken between 1871 and 1921 allow for a more detailed examination of the population changes on the island as the country entered the twentieth century. In 1921, the census counted 37,059 Dominicans, about 10,000 more than in 1871. This again reflected a very low average annual rate of growth—0.7 percent.

Mortality must have declined somewhat in this period, however, while fertility perhaps remained high. This was a common pattern of changing demographic behaviour in developing countries, particularly in the late nineteenth and early twentieth centuries. As a result, natural increase was probably greater than had previously been the case.

Table 1: Population of Dominica, 1844–1921

Year	Number
1844	22,200
1871	27,178
1881	28,211
1891	26,941
1901	28,894
1911	33,863
1921	37,059

Emigration, on the other hand, undoubtedly increased. Demands for foreign labour were being made particularly in Panama, where the canal was under construction. The larger islands, too, very likely seemed attractive to Dominicans seeking employment. Crude birth rates probably averaged 45 per 1,000 population, while death rates hovered around 30 per 1,000 early in the twentieth century. If approximately correct, this would mean a net emigration of some 7 per 1,000.

No censuses were taken between 1921 and 1946, although in 1931 the population of Dominica was estimated to be 39,500. By the time of the 1946 count, the nation had grown to 47,630. Over that 25-year period (1921–46), the population had increased by 10,565—an average annual rate of 1 percent. More reliable vital statistics are available for that period than for earlier years, which yields a more accurate description of what transpired demographically over this quarter of a century.

While the population grew by 10,565, there were 16,202 more births than deaths over the period. If these statistics are relatively accurate and if the censuses of 1921 and 1946 were comparable as to universality, this would indicate net emigration of 5,637 persons over the 25 years.

Crude birth rates fell from 37.6 per 1,000 population in 1921–25 to 33.1 in 1941–45. This translates into about five births per woman. Over the same period, crude death rates fell from 23.4 to 18.9 per 1,000. Actually the death rates were even lower in the 1930s—as low as 15.4.

Given this information, growth through natural increase was in the range of about 1.5 percent per year, but the actual rate of population growth was considerably lower because of emigration.

Through the first half of the twentieth century, both fertility and mortality fell substantially and net emigration increased. The changes in fertility and emigration may have been related. As men left their homes in search of work, either in the United Kingdom or in neighbouring islands like Guadeloupe and Martinique, women were left behind. This interruption of marital relationships undoubtedly contributed to the smaller family size in this period.

It should be realized that the actual number of people emigrating at one time or another was considerably greater than the 5,637 mentioned earlier. This is a net figure and some people might have immigrated to Dominica, although fewer than those who departed. Additionally, many Dominican men were temporary migrants—people who left, often for two, three, or more years, but who eventually returned.

The quality of demographic data kept improving after the 1946 census, although the next official count did not take place until 1960. Caribbean demographers George Roberts and Jack Harewood have used both censuses to develop population and vital statistics estimates for each year between 1946 and 1960 for all members of the Caribbean British Commonwealth.* Their study serves as the prime source of figures in this report for those years.

The early post-World War II period shows the annual rate of population growth in Dominica averaged about 1.6 percent—much higher than had been observed previously (see Appendix Table A). Between 1946 and 1960, the population grew from 47,630 to 59,920.

The crude birth rate actually rose from 36.2 in 1946 to 46.9 in 1960, while the crude death rate fell from 20.9 to 14.9. As a result, the rate of natural increase went up dramatically, from 1.5 to 3.2 percent. It is quite rare in a developing country for the crude birth rate to go up while the crude death rate goes down, yet this is what occurred in Dominica as women gave birth to more children—probably averaging five or six—while mortality, particularly infant mortality, fell.

For the entire 14-year period of 1946–60, a total of 30,720 births and 12,260 deaths were recorded. This natural increase of 18,460 was offset in part by net emigration of 6,190. In sum, population increased quite rapidly despite a high level of emigration because fertility rose while mortality was falling.

Between 1960 and 1970, the island's population grew by nearly another 10,000, and the number of Dominicans reached 69,549. The average annual rate of growth for that decade was once again a high 1.5 percent. Fertility levels continued to be high—the overall average crude birth rate being about 42 per 1,000. Mortality levels fell substantially by 1970; the crude death rate was 10.0 per 1,000.

As a result, natural increase—already high in the 1950s—increased in the 1960s and it was only because of massive emigration that the annual rate of growth stayed as low as 1.5 percent. In round numbers, natural increase amounted to 20,000 (26,000 births and 6,000 deaths), with a net emigration of about 10,000 over the decade.

Movements out of Dominica since 1946 were toward the neighbouring islands of Guadeloupe and Martinique as well as toward the larger islands and the metropolitan countries—the United Kingdom, Canada, and the United States. Migration to the United Kingdom almost came to a halt with the passage of the Commonwealth Immigration Act of 1962. Thereafter the United States became increasingly attractive, as did Canada. Indeed, during the 1960s, some 10 percent of the people leaving Dominica headed for the United

*G.H. Roberts and Jack Harewood, *Estimates of Intercensal Population by Age and Sex and Revised Vital Rates for British Caribbean Countries, 1946–1960* (University of West Indies, 1964).

Table 2: Permanent Dominican-Born Immigrants Admitted to the United States, 1960–79

Year	Number
1960–64	423
1965–69	837
1970–74	1,144
1975–79	2,827

States, according to the U.S. Immigration and Naturalization Service (see Table 2).

Between 1844 and 1970, Dominica's population more than tripled, in large part due to levels of fertility that remained high throughout the period. Indeed, were it not for substantial emigration, particularly during the postwar years, Dominica's population would have easily surpassed the 100,000 mark by 1970.

Dominica Today

Among the English-speaking East Caribbean nations, Dominica was the only one to hold a census in 1981. All the others—save Antigua and Barbuda, which had no decennial enumeration whatsoever—had their censuses in April 1980. To facilitate the development of ten-year estimates and projections and to allow for more realistic comparisons with other nations, the population of Dominica as of April 7, 1980, must be estimated through the process of reverse projections.*

The 1981 census enumerated 73,795 Dominicans; for the purposes of this report, the 1980 population is estimated to have been 73,337. The level of growth subsided during the 1970s, compared with earlier decades, and thus the population change between 1970 and 1980 was small. The remainder of this section will concentrate on the changes between the 1970 census and the 1980 estimates—a ten-year interval.

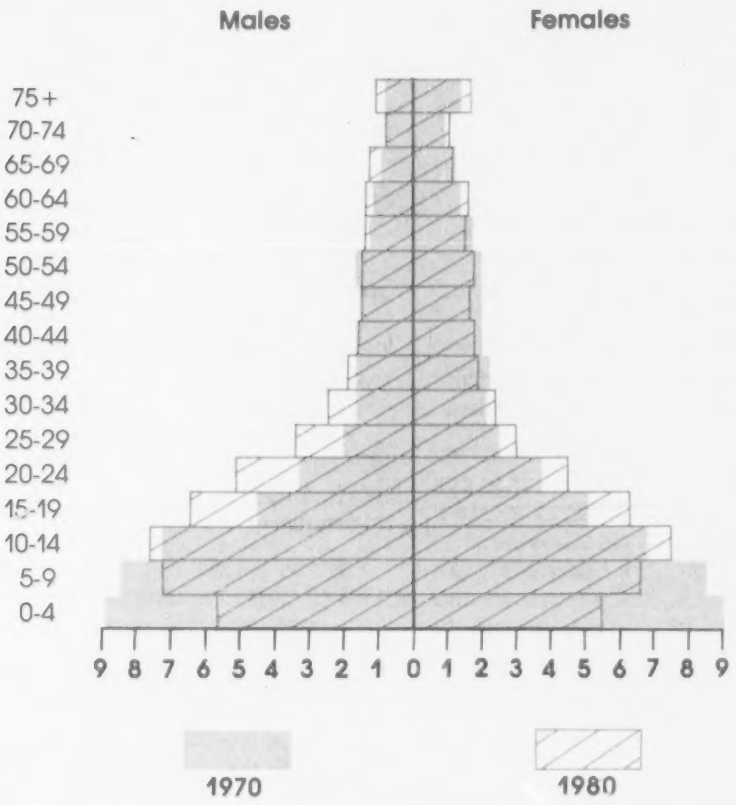
Dominica's population increased by 3,788 over the decade, for an average annual rate of growth of 0.5 percent—markedly lower than that observed during the 1950s and 1960s. A major contributor was the drop in fertility. From a crude birth rate of 39.0 per 1,000 in 1970, the rate gradually fell to 25.1 in 1975 and to 21.0 in 1979. The rates for 1980 as well as 1981 were slightly higher: 24.8 and 27.6 respectively.

For this report the total fertility rate in 1980 (that is, the average number of live births per woman) is estimated to have been about 3.4. Over the most recent ten-year period for which statistics are available (1972–81), a total of 18,956 births were registered—substantially fewer than the 26,000 estimated for the 1960–69 period.

The 1970s saw the increasing acceptance of family planning on the part of Dominican couples and this undoubtedly contributed to the lower fertility. However, the particularly low crude birth rate of 21.0 noted for 1979 warrants an explanation. In that year, marked by a disastrous hurricane, hundreds of women moved to Guadeloupe, where many births to Dominicans took place. Thus this out-migration had the effect of dampening the fertility rate in Dominica.

*The reverse projection method "survives" the population by age and sex backward in five-year intervals. By using appropriate survival rates, a population—males aged 45–49 in 1980, for example—can be restored to the number who would have been 40–44 in 1975 and 35–39 in 1970. Assuming relatively complete censuses in both 1970 and 1980, any differences in the age-sex distribution in 1970 between the restored and the actual enumerated population must be accounted for by either immigration or emigration. This yields only a rough estimate of the level of net migration over a decade; nonetheless it is the best available, short of actual data on migration itself.

Figure 1: Age-Sex Distribution of Dominica, 1970 and 1980



Mortality also fell during the 1970s. However, with the crude death rate already a low 10.0 in 1970, further declines were necessarily minimal. By 1980 the rate had fallen to about 6 per 1,000 and life expectancy approximated 65 years. Such a rate is remarkably low—much lower in fact than most developing nations. However, it reflects the young age composition of Dominica as much as it does its improving life expectancy.

Infant mortality rates fell particularly sharply, from 119.6 per 1,000 births in the 1950s to 67.3 in the 1960s and to 27.0 in 1977. Thus, overall, there has been great success in extending life in Dominica over the past ten years.

Emigration continued at a high level throughout the 1970s—perhaps at close to 900 per year. Indeed, some 4,000 Dominicans entered the United States during this decade. Interestingly, more women than men left the island. This is reflected in the census enumerations of 1970 and 1981. In the former year, the sex ratio was 90.1—that is, there were 90 males for every 100 females, reflecting the long-term out-migration of males over many years. By 1981, the sex ratio was 99.2. The male population increased by 3,500 over the 11 years while the female population did not grow. The reason is clear: many more women emigrated, particularly after the 1979 hurricane.

The recent decline in fertility and the changes in migration patterns have contributed to significant upheavals in the age composition of the Dominican population (see Figure 1). Its median age went

from 15.4 to about 18.5 in just ten years. Although still a young population, an increase of 3 years in median age in one decade is substantial and can be attributed primarily to the rapid fall in the number of births.

In 1970, about half the Dominicans were under the age of 15; at the other extreme of the age spectrum, 5.9 percent were aged 65 or older. The dependency ratio (the number of persons of dependent age—under 15 or 65 or older—per 100 persons between 15 and 64) was a high 122. There were 20 percent more "dependent" than "active" persons.

By 1980, the age composition picture had changed considerably. Only 40 percent of the population were under 15 while 7.2 percent were 65 or older. The resulting dependency ratio was far more favourable—89 persons of dependent age per 100 of active age. This is still relatively high and reflects the fact that many persons of active age have emigrated.

A close examination of Figure 1 should cause a little wariness of these statistics. The population under 5 in 1980 amounted to 8,177, or 1,927 fewer than the 5–9 year olds. Although fertility has been falling, such a difference seems to reflect the aforementioned tendency of Dominican women to migrate to the neighbouring French islands after the disastrous 1979 hurricane and to give birth in those countries. The figures here have not been adjusted but the reader should be aware of this possibly misleading statistic.

Changes in age distribution occasionally disturb social institutions such as schools. In Dominica, however, the falling fertility of the 1970s has contributed to a stability in school enrollment. There has been but scant change in the school-age population (5–14) between 1970 and 1980.

As Dominica moves through the 1980s, its numbers approximate 75,000. Fertility has fallen considerably and the island has low mortality but emigration continues to be high. Dominica continues to have a young population. Clearly it is at a demographic crossroads. Population cannot increase much more but barriers may well be erected by receiving nations, thereby limiting emigration as a means of population control. The implications of such a development will be discussed in the next section.

Dominica Tomorrow

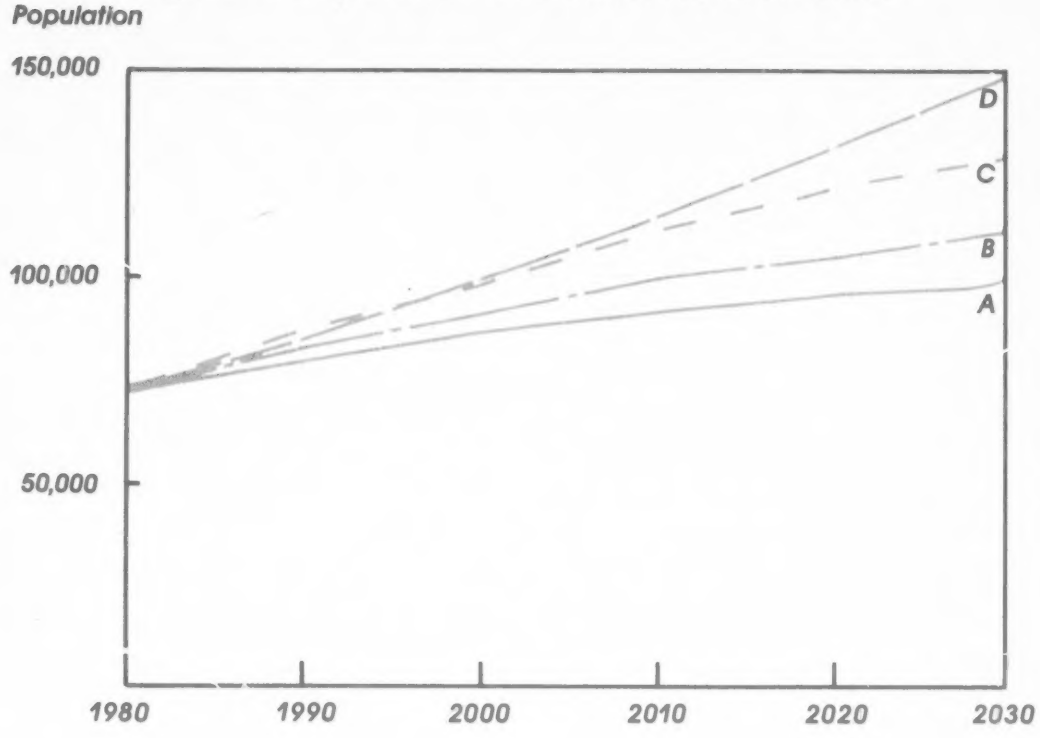
In making national plans for the future, possible changes in the population size and composition of the nation must be taken into consideration. Perhaps the following population projections for Dominica will contribute to the development of better informed social and economic planning. These are projections—not predictions—of the demographic future of the nation. This report does not attempt to predict the number and age distribution of Dominicans in any future year. Rather, it selects what appear to be reasonable or interesting alternative patterns of demographic behaviour and projects what the future size and composition of the nation would be under various combinations of such patterns.

Demographic Assumptions: Three different postulates of fertility behaviour are used. One assumes that the current total fertility rate of 3.4 will remain the same for the next 50 years. The second supposes a decline in fertility to 2.6 live births per woman on average by 1990, after which the rate would remain constant. The third postulates a decline in the total fertility rate to 2.1 by 1990, with no change thereafter. Such a drop is highly unrealistic but is included for illustrative purposes as it is the level needed to achieve zero population growth in the absence of migration.

Only one set of mortality assumptions is used. Life expectancy is projected to increase from 68 years at birth to 74 years by 2010 for females and from 61 years to 66 for males.

Three alternative migration patterns are postulated. The estimated current level of net emigration of 800 per year could remain constant in future years. A second pattern might be that net emigration

Figure 2: Population of Dominica, 1980–2030



A: TFR of 3.4, net emigration of 800
B: TFR of 2.6, net emigration of 400
C: TFR of 2.1, net migration of zero
D: TFR of 3.4, net emigration of 400

drops to 400 per year beginning in 1980. Finally, for illustrative purposes, an assumption of no migration is also considered.

Based on these alternative postulates about demographic behaviour, four different future population scenarios have been prepared for Dominica (see Figure 2: for supporting data, see Appendix Table B):

Scenario A–current fertility (3.4) and current net emigration (800 per year)

Scenario B–declining fertility (2.6) and declining net emigration (400 per year)

Scenario C–replacement-level fertility (2.1) and net migration of zero

Scenario D–current fertility (3.4) and declining net emigration (400 per year).

Numerous other combinations of future patterns of fertility, mortality, and migration are of course possible. These four have been selected to illustrate the wide range of possibilities that exist.

Population Projections: Currently fertility in Dominica is fairly low. The crude birth rate is about 27 per 1,000 and the total fertility rate is 3.4. Similarly, net emigration is high. If the assumed 800 per year is approximately accurate, this yields a rate of 11 per 1,000—high by any standard. Finally, life expectancy is already quite high but should nonetheless improve somewhat in future years.

A continuation of such a demographic situation (Scenario A) would result in relatively small growth in future years. By the turn of the century Dominica's population would reach 86,000, about 13,000 more than in 1980. This would reflect an annual rate of growth of 0.9 percent. Thirty years later, in 2030, the population would peak at about 97,000 and would remain fairly constant thereafter. At that time the crude birth rate would be 20.0; the crude death, 12.7; and the net emigration rate, 8.3.

Insofar as size is concerned Scenario A, a continuation of current demographic behaviour, is encouraging. Dominica's carrying capacity is of course limited, but an eventual no-growth population of between 100,000 and 110,000 would appear to be quite reasonable. Any further growth beyond that level would seem to be unwise.

However, fertility must remain at its present fairly low level for such a goal to be attained with the continued high level of net emigration assumed. Is it realistic to make such an assumption about future patterns of migration? What would occur if the emigration level was reduced by half, for example? Such a development is not that remote a possibility. The United States and Canada may well reduce legal migration in future years; Guadeloupe and Martinique may well establish stronger regulations as may other Caribbean nations that themselves begin to worry about growth.

A brief examination of Scenario D (current fertility and half the current net emigration) illustrates the possibility of such a situation. By the year 2000 the population of Dominica would have reached 99,000; by 2030, it would be close to 150,000. Even at that time, the overall rate of growth would still be 1.2 percent—a clearly impossible situation.

Obviously any decine in net emigration would necessitate parallel declines in fertility to compensate for the increase in numbers. Scenario B offers one possible direction to follow. With a total fertility rate of 2.6 and net emigration limited to 400 per year, Dominica's population would still grow. By the turn of the century it would have passed the 90,000 mark and by 2030, the 110,000 mark. At that time its crude birth rate would be 16.7; its crude death rate, 11.9; and its net emigration rate, 3.6. Thereafter very little growth would occur. Indeed its population would peak at 112,000 in 2040. This, then, appears to be a reasonable alternative path to follow should levels of net emigration be reduced in future years.

Demographers have long discussed the built-in momentum for growth in any society's population. Scenario C has been prepared to illustrate this important demographic fact. Here it is assumed that the level of fertility falls to 2.1 live births per woman by 1990 and that net migration equals zero from now on. A total fertility rate of 2.1 is the level needed to replace the population in the long run in the absence of migration. Interestingly, under Scenario C the population would grow more rapidly than it would under either A or B. The 100,000 mark would be attained shortly after 2000 and by 2030, the population would reach 129,000. All further growth would cease some ten years later at 132,000, at about double the current size.

How can a population continue growing—almost doubling its numbers—when its fertility is at the so-called replacement level? Recall that Dominica has a very young population. Without the continued historical emigration of many young people, the large number of youth become a large number of adults. Even if they limit themselves to 2.1 live births per woman, so many women are in their reproductive years that the number of births keeps increasing although the birth rate is falling. It is only in the next generation and the one after it that the young adult group becomes small enough in size not to have as many children. On average it takes some 60–70 years for a nation to attain zero population growth, without migration, after its fertility first reaches replacement level.

Scenarios C and D are both unrealistic. However, they serve to point out the enor-

Table 3: Percent Distribution of Population by Age-Group in Dominica, 1980–2030

Scenario	1980	1990	2000	2010	2020	2030
Scenario A						
Under 15	41	32	34	29	27	27
15–64	53	61	59	64	64	60
65 or older	6	7	7	7	9	13
Scenario B						
Under 15	41	32	30	27	24	23
15–64	53	62	64	67	68	65
65 or older	6	6	6	6	8	12
Scenario C						
Under 15	41	32	28	25	23	21
15–64	53	62	67	70	71	68
65 or older	6	6	5	5	6	11
Scenario D						
Under 15	41	33	35	32	31	31
15–64	53	61	59	63	63	60
65 or older	6	6	6	5	6	9

mous long-run impact of change in fertility or migration behaviour. It is thus important that policymakers be aware of this built-in momentum and take it into consideration in their planning.

As far as population size is concerned, Dominica appears to be in a fairly fortunate position as it approaches the turn of the century. This is in large part due to its recent decline in fertility and its continued high level of net emigration. But any increase in fertility—however slight—or any decline in net emigration could lead to serious population problems in the not-too-distant future. It is thus suggested that both fertility and migration be measured as accurately as possible and monitored closely to detect any changes in either or both.

As noted earlier, changes in demographic behaviour affect not only population size but also population composition, particularly age distribution. In the short run, changes in age distribution may be even more important than variations in population size. Furthermore, past variations in fertility, mortality, and migration will affect the age distribution for many years to come.

Irrespective of scenario, the population of Dominica will age in future years. That is to say, the proportion of youth will decline while that of the elderly will grow (see Table 3). For example, under a continuation of current demographic behaviour (Scenario A) the proportion under age 15 will fall from 41 percent today to 34 percent in 2000 and to 27 percent in 2030. Under B, that proportion would drop even more dramatically, to 23 percent in 2030. On the other hand, the proportion of the population who are elderly—those 65 or older—would grow from being 6 percent of the population today to between 9 and 13 percent within 50 years under any of these four scenarios.

Together, then, changes in demographic behaviour, whether in the recent past, the present, or the future, are going to have a significant effect on the age composition of the Dominican population for many years to come. But proportional variations are far less important than numerical variations. The percent of youth